APOLLO G&N Specification
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POST-INSTALLATION CHECKOUT SPECIFICATION

FOR LM G&N SYSTEM

Record of Revisions

	Date	Revision Letter	TIRR No.	Pages Revised	APPROVALS AC	APPROVALS NASA
(1)	11/22/66	A	32056	1-83 Was 83 pages, now 89 pages.	EA	WLS
(2)	12/29/66	B	32480	6-46, 51, 62, 67, 73, 74, 78	JP	--
(3)	2/27/67	C	33084	5-86	EA	--
(4)	4/17/67	D	33613	3, 6, 7, 16, 17, 18, 22, 23, 28, 35, 44, 45, 64, 79, 85	EA	WLS
(5)	7/27/67	E	34218	3, 5-7, 9-12, 14, 16-86; was 86 pages now 94 pages.	EA	--
(6)	11/2/67	F	35010	6-94; was 94 pages, now 95 pages.	EA	--
(7)	1/12/68	G	35420	87	EA	--
(8)	2/26/68	H	35774	3, 5, 6, 11-14, 17-21, 24, 26, 28-95; was 95 pages, now 100 pages.	EA	WLS
	7/23/68	J	[illegible]	10, 12-100; was 100 pages, now 105 pages.	EA	RJJ

This specification consists of page 1 to 105 inclusive.

APPROVED

Paragraph No.	Test Title
6.3.1	Standby Power In Test
6.3.2	Alarms and Interrupts Test
6.3.3	IMU Operate Power On Test
6.3.4	Temperature Control Verification
6.3.5	PGNCS Power Supply Test
6.3.6	IMU Operational Test
6.3.7	PGNCS Operational Test
6.3.8	IMU Scale Factor Test *
6.3.9	IMU Performance Test *
6.3.10	LGC Voltage Margin Test
6.3.11	LGC Clock Frequency Test
6.3.12	Gimbal Friction Test
6.3.13	Stabilization Loop Response Test
6.3.14	G&N Fine Alignment Test
6.3.15	AOT Functional Performance Test

* To be performed periodically every sixty days.

G&N TESTS

FIGURE 1

6.2.4.10 CAUTION: LGC OPERATE AND IMU STANDBY power must have been applied a minimum of two hours before energizing the IMU OPERATE circuit breaker in step 6.2.4.16 unless all of the following conditions are met:

IF: 1. The G&N System has previously been in Standby Mode at least two hours and subsequently been in Operate Mode, AND

2. The gimbals were placed in a parked position prior to shutdown, AND

3. The shutdown period did not exceed 5 days, AND

4. The Spacecraft or IMU have not been moved in any way during the shutdown period,

THEN: The two-hour standby Mode operation requirement is reduced to 15 minutes.

6.2.4.22 On the CRT, scan the power supply voltages to verify their normal operation. (No indications flashing).

6.2.4.23 After all the tests of 6.3 in Figure 1 have been completed, the General Turn-On Procedure (6.2.4) and IMU Operational Test (6.3.6) shall be completed before re-running any test. Otherwise, the testing sequence shall continue in accordance with Figure 2.

6.2.5 Interruption of Power

6.2.5.1 IMU Operate power shall never be applied without the presence of LGC Operate and IMU Standby Power.

6.2.5.2 The G&N System log book shall include the gimbal positions at time of power shutdown. If omitted, it shall be assumed that the gimbals were not parked prior to shutdown. The log book shall also state if any movement of the IMU or Spacecraft has taken place after shutdown. The times of application and removal of any bus power to the G&N System shall be recorded.

6.2.5.3 After the system has been operating with IMU Operate power on, and a power interruption occurs, immediately set the IMU Operate power circuit breaker to OFF. When power is restored a minimum of 15 minutes operation in Standby Mode is required before resuming IMU Operate power. If the power interruption was longer than 15 minutes, the G&N System shall be run in Standby Mode for a time interval atleast equal to the duration power was off before resuming IMU Operate power. However, this period need not exceed two hours before application of IMU Operate power.

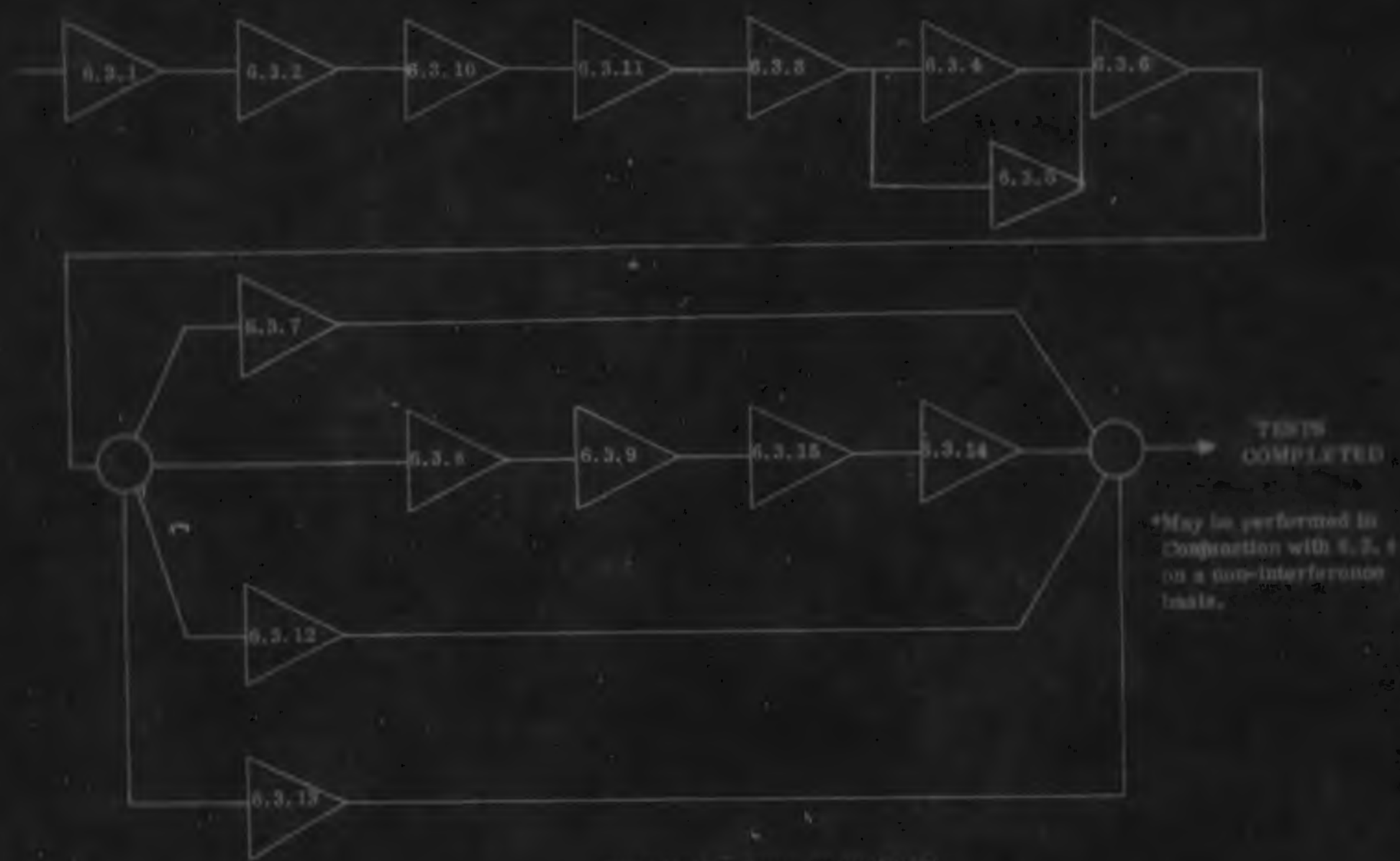
6.2.6 A warmup period of at least one hour in Operate mode is required prior to performing any test in which gyro or accelerometer parameters are measured, and at least 15 minutes prior to any test in which precision amplitude and frequency power supply checks are made.

6.3 TEST PROCEDURES

6.3.1 Standby Power On Tests

6.3.1.1 The Portable Temperature Controller, Model No. 400-31058 shall be supplying inertial component heater power to the G&N System through connector 56J1 (P230). If alarm or fail indications are present on the PTC, they shall be cleared by depressing the SYSTEM RESET pushbutton on the PTC.

6.3.1.2 Verify that spacecraft power checks, including both polarity as well as magnitude on the spacecraft power connectors, have been accomplished.



*May be performed in Conjunction with 6.3.4 on a non-interference basis.

TEST PROCEDURE FLOWGRAM

FIGURE 2

6.3.1.6.2 Lamp Test

6.3.1.6.2.1 Initiate the Lamp Test by entering in the DSKY:

VERB 35 ENTR

6.3.1.6.2.2 The following DSKY displays shall illuminate for approximately 5 seconds. On CAUTION/WARNING panel, the following displays shall illuminate, then extinguish:

LGC
ISS

a. UP LINK ACTY
b. NO ATT
c. STBY
d. KEY REL flashing
e. TEMP
f. GIMBAL LOCK
g. PROG
h. RESTART
i. TRACKER
j. OPR ERROR Flashing
k. VERB-NOUN Flashing
l. Plus 88888 in Row 1, Row 2, and Row 3

} On concurrently for approximately 5 seconds.

8's remain in the VERB NOUN display
+8's remain in DSKY Row 1, 2 and 3 display

6.3.1.6.3 Uplink Check

6.3.1.6.3.1 On K-START 148; set LOAD/INHIBIT switch to LOAD, set TAPE/KEY switch to KEY, then enter the following:

ERROR RESET
VERB 25 NOUN 01 ENTR
02400 ENTR
+01234 ENTR
-56789 ENTR
+00000 ENTR

6.3.1.6.3.2 Verify the following is displayed on the DSKY.

VERB 23 NOUN 01
R1 = 01234
R2 = 56789
R3 = 00000

6.3.1.6.4 Downlink Check

6.3.1.6.4.1 On CRT, DSKY display, verify the following is displayed:

VERB 23 NOUN 01
R1 = 01234
R2 = 56789
R3 = 00000

6.3.1.6.5 LGC Self-Check

6.3.1.6.5.1 On K-148 enter the following sequence:

1. ERROR RSET
2. VERB 36 ENTR
3. VERB 21 NOUN 01 ENTR
4. 01362 ENTR
5. 00000 ENTR ENTR
6. 01365 ENTR
7. 00000 ENTR
8. NOUN 15 ENTR
9. 00000 ENTR ENTR
10. 00000 ENTR ENTR
11. 00000 ENTR
12. Verify REDO Counter = +00000
13. VERB 21 NOUN 27 ENTR
14. 00010 ENTR
15. VERB 15 NOUN 01 ENTR
16. 01366 ENTR

6.3.1.6.5.2 On the CRT, DSKY display, verify that R1 does not display 01102 or 41102. If a malfunction occurs, the following is displayed:

R1 01102 or 41102
R2 XXXXX = (# FAIL) program address +1 of point of failure
R3 XXXXX number of fails.

6.3.1.6.5.3 When R3 = 00002, stop the LGC Self Check by entering in K-148 the following:

VERB 34 ENTR
VERB 21 NOUN 27 ENTR
00000 ENTR

6.3.1.6.6 LGC Standby Check

6.3.1.6.6.1 On K-148, enter the following sequence:

VERB 21 NOUN 17 ENTR
-00000 ENTR

Start ACE Countdown clock upon depressing ENTR from an initial setting of 0 HRS, 0 MIN, 0 SEC. Record difference between LGC time on the CRT and the Countdown clock.

VERB 60 ENTR
Verify on CRT ABL-LGC-STBY is ON

6.3.1.6.6.2 On DSKY depress PRO pushbutton for approximately 2 seconds.

6.3.1.6.6.3 Verify STBY status indicator lamp is ON.

6.3.1.6.6.4 On the CRT, verify the 3.2 KC 28V Supply (GG2331) is between 28.04 and 29.16V RMS.

6.3.1.6.6.5 On DSKY depress PRO pushbutton for approximately 2 seconds to return to LGC OPERATE mode. If the LGC does not return to the OPERATE mode, depress the PRO pushbutton for a maximum of two additional times.

6.3.1.6.6.6 Verify STBY status indication lamp is OFF. RESTART light may be ON, verify LGC WARNING OFF. Press ERROR RESET pushbutton. Enter VERB 61 ENTR on K-148. Verify on CRT ABL-LGC-STBY is OFF. Record LGC time on the CRT and time displayed on the countdown clock simultaneously. Verify that the difference between the LGC time and countdown clock is within one second of the difference recorded in 6.3.1.6.6.1.

6.3.1.6.7 Standby/Proceed Check

6.3.1.6.7.1 On K-148 enter the following:

VERB 11 NOUN 10 ENTR
00032 ENTR

6.3.1.6.7.2 On the DSKY press and hold the PRO pushbutton. Verify Row 1 of the DSKY displays 57777.

6.3.2 Alarms and Interrupts Test

6.3.2.1 Parity Fail Test

6.3.2.1.1 On K-148 enter the following sequence

VERB 21 NOUN 02 ENTR
01600 ENTR
33777 ENTR

6.3.2.1.2 On CRT, DSKY display, verify R1 = 33777 and R2 = 01600

6.3.2.1.3 On K-148 enter the following sequence

VERB 25 NOUN 26 ENTR
04000 ENTR
01600 ENTR
00003 ENTR
VERB 30 ENTR

6.3.2.1.4 Verify RESTART lamp is ON.

6.3.2.1.5 On K-148 enter VERB 36 ENTR. Press ERROR RESET pushbutton. All alarms shall clear.

6.3.2.2 Rupt Lock-Interrupt Too Long

6.3.2.2.1 On K-148 enter the following sequence

VERB 24 NOUN 01 ENTR
01600 ENTR
30001 ENTR
01600 ENTR
VERB 25 NOUN 26 ENTR
00001 ENTR
01600 ENTR
00003 ENTR
VERB 31 ENTR

6.3.2.2.2 Verify RESTART lamp is ON.

6.3.2.2.3 On K-148 enter VERB 36 ENTR. Press ERROR RESET pushbutton. All alarms shall clear.

6.3.2.3 TC Trap Test

6.3.2.3.1 On K-148 enter the following sequence

VERB 21 NOUN 01 ENTR
01600 ENTR
01600 ENTR
VERB 25 NOUN 36 ENTR
04000 ENTR
01600 ENTR
00003 ENTR
VERB 30 ENTR

6.3.2.3.2 Verify RESTART lamp is ON.

6.3.2.3.3 On K-148 enter VERB 36 ENTR. Press ERROR RESET pushbutton. All alarms shall clear.

6.3.2.4 Nightwatchman Test

6.3.2.4.1 On K-148 enter the following sequence

VERB 24 NOUN 01 ENTR
01600 ENTR
30001 ENTR
01600 ENTR
VERB 25 NOUN 36 ENTR
03400 ENTR
01600 ENTR
00003 ENTR
VERB 30 ENTR

6.3.2.4.2 Verify RESTART lamp is ON.

6.3.2.4.3 On K-148 enter VERB 36 ENTR. Press ERROR RESET pushbutton. All alarms shall clear.

4.5.3 IMU OPERATE POWER ON TEST

	ENTR SET LOC
	ENTR CCS NEW JOB
	ENTR TC CHANG
	ENTR TC ACTLITON
VERB 25 MOUNT	ENTR CALL PRIO/DELAY
	ENTR 01 PRIORITY
	ENTR RELATIVE Z-REF
	ENTR BANK ADD
	ENTR REQ EXEC

becomes from step 6.1.3.1.4.

DSS WARNING is OFF [illegible]

[illegible]

[illegible] the noise peaks of the following signals are [illegible]

[illegible]	Measurement No.	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

2.2.6 VMU OPERATIONAL TEST

[illegible]

3.2.7.12.3 On K-146 insert VERB 33 ENTER. The GIMBAL LOCK lamp on

lighted.

Shall be

IMU CDU Fine Fail Test

On Event Module verify that IMS WARNING

VERB 25 NOUN 26 ENTER

VERB 25 NOUN 26 ENTER

VERB 21 NOUN 01 ENTER

VERB 22 NOUN 27 shall be displayed

MODE Att ERROR is between +15.5 and +16.5 V DCO (pin 10)

ENTER

VERB 23 NOUN 22 shall be displayed

On CRT verify the following:

PITCH ATT ERROR is between [illegible] DEG ([illegible])
YAW ATT ERROR is between +[illegible]
ROLL ATT ERROR is between [illegible] DEG ([illegible])

VERB 21 NOUN 01 ENTER

[illegible] 7.20.8 On CRT verify the following:

[illegible] ENTER

[illegible] 7.20.9 On CRT verify the following:

VERB 22 NOUN 22 shall be displayed

[illegible] 7.20.10 On CRT verify the following:

[illegible] 7.20.11 On E-148 enter the following:

VERB 23 [illegible] ENTER

[illegible] 6 DSKY (GOBBY)

[illegible] DSKY (GUZZA[illegible]

NOLL ALT ERROR is [illegible]

VERIF 21 MODE 01

shall be displayed.

On CRT verify the following:

NAV ATT ERROR is between -15.3 and -15.7

[illegible]

[illegible] On [illegible]

[illegible]

[illegible] Receiver [illegible]

[illegible]

[illegible] On the CRT

[illegible]

On CRT verify the following:

[illegible]

[illegible]

[illegible]

[illegible] 2 — CCCC, C = DDDD, D [illegible]

[illegible]

[illegible] of the following paragraphs, [illegible]

+00000 ENTR (Test Time in Seconds)

[redacted]

[redacted]

6.3.9.17 In approximately 5 minutes, VERB 06 NOUN 66 [redacted]. From the CRT, record 81

[redacted]

[redacted]

[illegible]

[illegible] 6a (Ko14) enter the following command:

[illegible]

[illegible]

[illegible] GIMBAL LOCK lamps on.

[illegible]

[illegible] Record data [illegible]

[illegible]

[illegible] and transfer results to line 1.

[illegible]

[illegible] 65 [illegible] 65 shell fault

[illegible]

VERB 06 NOUN 66 s [illegible]

[illegible]

. 3. D. 50 On K-148 enter the following [illegible]

VERB 34 ENTE [illegible]
VERB 06 NOUN 66 shall flash [illegible]

[illegible]

VERB 36 ENT [illegible]

[illegible]

Gain measured acceleration from this ch

[redacted] will transfer all [redacted] to these as through [redacted]

$$D_1 = \left| x_{i-1} - x_i \right|$$

$$D_2 = \left| x_{i-1} - x_i \right| + \left| x_{i-2} - x_{i-1} \right|$$

[redacted]

ITEM NO.	PARAMETER	RECORDED VALUE
	Transfer mass to Hot	
	EX PIPA Test	
	CH ADX Position +0.0002 Transfer mass to Hot	
	EX PIPA Test	
	CZ PIPA Test	
	CZ PIPA Test Position +0.0000	cm/sec
	CX ADX + ADZ	
	CY PIPA Test	
	CY PIPA Test Position +0.0000	

[illegible] (NBDY+ADSRAY) [illegible] (NBDY) [illegible]

ADSRAY [illegible]

(NBDZ+ADIAZ) = (NBDZ) [illegible]

ADIAZ [illegible]

(line o [illegible]) X 1.414 = ([illegible]

ADIAX [illegible]

[illegible] (NBDY - NBDX) [illegible] (ADIAY - ADIAX) [illegible] ADSRAX [illegible]

[illegible] 060/52 [illegible] line w x 1 cm/sec/pulse = [illegible]

cm/sec
pulse

Z PIPA S. F. [illegible]

X PIPA BIAS [illegible]

Y PIPA BIAS [illegible]

[illegible] 2 (line g [illegible] line i) = ([illegible]

DATA SHEET

DATA SHEET

PARAMETER		
INDEX		
DELAY		
X PIPA S. F. error		PPM
		PPM
Z PIPA S. F. error		PPM
X PIPA Bias		
Y PIPA Bias		
Z PIPA Bias		

DATA [redacted]

[illegible]

[illegible].3.10.2.7.1 Into R154 insert 0011. Verify and execute.

[illegible]

6.3.10.2.10 Enter in C-156 (a) XX: X001114 (Enter a value for XX which will adjust the [illegible] to 16.4 (+0 -0.4) vdc. See Table 1.

[illegible]

[illegible] INHIBIT VOLTAGE FAIL switch to OFF. [illegible] RESTART lamp on the [illegible] INHIBIT VOLTAGE FAIL switch to ON. [illegible] Perform the following DSKY op[illegible]

[illegible]

Set the FUNCTION switch to: MAN START
Set the TIME BASE switch to: 1 μs TIME UNIT/COUNT
Set the SENSITIVITY control to: CALIB

INTERVAL

MODE switch to PRINT

[illegible] for 3 seconds. Verify the STANDBY

[illegible] Enter VERB 61 ENTER on K-1 [illegible]

[illegible]

VERB 11 NOUN 10 ENTER

ITEM NO.	SIGNAL NAME
[illegible]	PIPA TEMP
[illegible]	IRIG TEMP

[illegible] GET DESC [illegible]

[illegible] ENTR

VERB [illegible] ENTR

VERB 41 NOUN 20 ENTR

VERB 41 NOUN 20

VERB 41 NOUN 20 ENTR

MEAS NO.

OG Servo Error A Phase
OG Torque Motor Current
OG Servo Error Total

OG 1x Resolver Cos
OG CDU Coarse Error

3.5.16.3.3 On the CRT

	SIGNAL NAME

3.5.16.3.6 On E-14

VERB AL NOUN 20 ENTR

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	

3.5.12.2.12 On the CRT, DSKY display verify:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

3.5.12.2.13 [illegible] +1DP [illegible]

[illegible]

3.5.12.2.14 On K-144 enter the following sequence:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	
[illegible]	ENTR	
[illegible]	[illegible]	

[illegible]

[illegible] CMX-150 enter the following [illegible]

[illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible] the IMU stabilization loop.

30 sec/sec. (MG RESPONSE

[illegible]

(TA Fig. 3) between the removal of the step [illegible]
5 percent of the step magnitude (A, Fig 3)

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

VERB 21 ENTR

VERB 22 ENTR

XXX,XXX ENTR (L opt. elevation from 6.3.15.1.3.

VERB 23 ENTR

ANGOL,XCH	ENTER (value of LY)	
VERB 25	NOUN 62	(Flashing)

[illegible]

[illegible] = [illegible]XXXXX (Fractional [illegible] part [illegible]

[illegible]

Observe on CRT DSKY display and record:
V[illegible] [illegible] noun [illegible] (Flashing)

[illegible] = XXXXX (Whole number [illegible]
[illegible] = [illegible]XXXXX (Fractional [illegible]

[illegible]

Press ERROR RESET [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 12 Level the Theodolite [illegible]

[illegible]

NOUN 43 flashing

Observe VERB 21 NOUN 42 flashing

[illegible]

[illegible]

[illegible] 15. 12. 12 Set AOT in F detent [illegible]

[illegible]

[illegible] 6. 2. 15. 15. 13 [illegible]

[illegible] ENTR (PY from 6. 2. 15. 16. 14) [illegible]

Observe [illegible] VERB 2[illegible]

[illegible] ENTR (PS from 6. 2. 15. 15. 13) [illegible]

[illegible] NOUN 03 displayed [illegible]

[illegible]

[illegible]) on CRT DSKY display. [illegible]

[illegible] Reticle Dimming Assembly, [illegible]

[illegible] 30 flashing on DSKY.

[illegible] 5.3.3.2.2.17.4 On DSKY enter:

[illegible]

[illegible] 15. [illegible] Rotate SXT control knob clockwise until the center of the target [illegible]

[illegible]

[illegible]

Observe [illegible]

[illegible]NTER (PRO from 6.2.15.17.9[illegible]
NOUN 42 flashing
[illegible]NTER (PRO from 6.2.15.17.[illegible]
NOUN 43 displayed

	SIGNAL NAME	REQUIREMENT	PROGRAMMED/CO[illegible] OF [illegible] SEALI
GG A201 Hole [illegible]			
GG B201 Hole [illegible]			
GG C201 Hole [illegible]			
GG D201 Hole [illegible]			
GG 2101 Hole [illegible]			
GG 2112 Hole [illegible]			
	28V/1CC [illegible] 28 VDC [illegible] STBY [illegible]		

[illegible] Gyrocompassing Test

[illegible]

[illegible] Gyro [illegible]

[illegible]

[illegible] VERIFY [illegible] NOUN 61 shall flash

[illegible]

GAEC Navigation Base Azimuth defined by GAEC)

[illegible]

for Row

If Row is incorrect VERB 21 ENTR
00000 Enter Correct Row Data Address

If Row 3 is incorrect VERB 22 ENTR

Add the following note prior to [illegible]

NOTE: Paragraph 6.2.2.3.3 [illegible]

Shaft CDU Fine Error
Shaft CDU Coarse Error
Trunnion CDU Fine Error

4.3.7.1.3.4. Start tape reader.

VERB 25 NOUN 26 LIST

BBBBB 2.5.11 [illegible] C (continued)

VERB 24 ENTER
Noun, XX ENTER (Correct navigation base estimate 46, 48 deg)
146, 148 ENTER (Correct site latitude)

DATA SHEET

Wait [illegible] seconds. Verify RESTART lamp on the DSKY is not lit.

[illegible] place INHIBIT VOLTAGE [illegible]

[illegible]

[illegible] MOUN 27 E1

[illegible]

DSKY is not lighted.

[illegible] 1100. Verify and execute.

Verify RESTART lamp on the DSKY is lighted.

[illegible] 6000. Execute.

On Computer Control [illegible]

[illegible] IV.3 Observe VERB 21 NOUN 20 flashing [illegible]

[illegible]

ENTR (1.5 from [illegible])

[illegible]

[illegible]

[illegible]

3.4.4.4 TC Trap Test

3.4.4.4.1 Use 16-148 enter the following sequence:

[illegible]

400100 ENTER	
On Event Module	

sequence per Step 6.8.7.10.2.1 and 6.8.7.10.2.2

VERB 21	ENTER

Wait for V16N21 MONIT 22 Display

Sect. 13.1.1 On K-14B enter the following sequence:

V 14 E 40	V 14 E 20	Enter	Wait 3 seconds
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]		
[illegible]	[illegible]		
[illegible]	[illegible]		

3.3.14.8 Verify CRT DSKY display [illegible]

VERB 06 NOUN 61 flashing

[illegible]

VERB 23 ENTER

Observe on CRT DSKY display

VERB61 NOUN 62 [illegible] flashing

[illegible]

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[illegible]

[illegible] Procedure Indicator 6.2.4.1

[illegible] system has previously been in Standby [illegible] subsequently been in Operate Mode, AND

The gimbals were placed in a parked position [illegible]

The shutdown period did not exceed 12 days [illegible]

[illegible]

RESTART

TRACKER

OPR ERROR Flashing

VERB-NOUN Flashing

[illegible] display

[illegible] display

[illegible]

On the DSKY verify "VEL" light is on.

[illegible]

On the DSKY verify [illegible]

ERROR RESET

Agreed and proceed.

following sequence:

[redacted]

[redacted]

[redacted]

[redacted]

VERB 02 NOUN 01 ENTER

Decoupl R1 and R2 (Optac Gimbal Lock)

6.3.9.4.1 On K-148 enter the following sequence:

[illegible] Calculations

[illegible]

[illegible]	PARAMETER	[illegible]	RECORDED VALUE

[illegible]

[illegible] LOCK MOUNT

[illegible] Under the following on [illegible]

[illegible]

VERB 06 NOUN 34

[illegible]

[illegible] on page [illegible]
[illegible] diameter assembly
[illegible] Vehicle [illegible]

[illegible] ACS lamp circuit breaker.

VERB 01 NOUN 01 ENTER

Record contents of CRT DSKY Row 1 xxxx

[redacted]

SIGNAL NAME
OG Torque-Motor Current
OG GUN Fire Error
[redacted]

[redacted]

[redacted]

[illegible]

[illegible]

3. Record CRT DSKY Row 2 [illegible]

3.3.14.6 Perform the following calculations:

[illegible]

3.3.14.6.b Calculate the times of [illegible] the following times:

[illegible]

Flashing

following seou

[redacted]

[redacted] (Czrock nay mas Azimek)

[redacted]

APOLLO GMI Sheet Metal

[redacted]

[redacted]

[redacted]

[redacted]

ADDENDUM 1

ADDENDUM III – BIBLIOGRAPHY

A-1. (MOC) – Lists-3 and Subsequent

signals all indicate 0.048.8 Volts but not 0.

$$\cos \theta_{y_0} = 1 - \frac{\theta_{y_0}^2}{2} \text{ (for small angle}$$

$$= 1 - 1 + \frac{(\theta_{y_0})^2}{2}$$

[redacted]

[redacted]

$$D_1 = \left| x_{i-2} - x_i \right|$$

$$D_2 = \left| x_{i-1} - x_i \right| + \left| x_{i-2} - x_{i-1} \right|$$

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

DATA SHEET

PIPA

ADIAX

ADSRAY

ADIAZ

line j - line q = ([illegible]

(+NBDX+ADIAX) - ([illegible]

-NBDZ + .707 ADSRAZ + NBDZ) X1.4 [illegible]

line p - .707 line [illegible] - .707 line r + .5 line q - .5 line t)

.707 (NBDY-NBDX) - .5 (ADIAY-ADIAX) + .5 ADSRAX

.707 (-NBDX) - .707 NBDY + .5 ADIAX - .5 ADSRAX] X

1000.00 ÷ line v x 1 cm/sec/pulse

Y PIPA S.F.

Z PIPA S.F.

X PIPA Bias cm/sec

Y PIPA Bias cm/sec

Z PIPA Bias

1/2 (line b + line d)

TABLE V

PARAMETER	UNITS	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]

on DSKY is lighted.

[illegible]

pushbuttons and verify RESTART light is off.

[illegible] ify RESTART lam [illegible]

[redacted]

[redacted]

VDC LGC SUPPLY
OUTPUT VS CONTROL

POST-INSTALLATION CHECKOUT SPECIFICATION

FOR LM GSE SYSTEM

[illegible]

[illegible] ENTER (PRY from 6,9,15,11 [illegible]

Observe VERB 22 NOUN 49 flashing.

[illegible] ENTER (PRS from 6,9,15,11 [illegible]

Observe VERB 51 flashing and R1 = 00000 [illegible]

[illegible]

6,9,15,11,11 On the DSKY [illegible]

[illegible]

Observe VERB 16 [illegible]

APPENDIX I

MEASUREMENT TOLERANCES

[illegible]

VERB 21 NOUN 10 [illegible]

[illegible]

[illegible]

[illegible] Paragraph [illegible] Lee follows

[illegible]

Addition 12: Revise Paragraph 6.3.10.2.7 to read as follows:

6.3.10.2.7 On PSAAM, set INHIBIT VOLTAGE FAIL switch ON.
On DSKY enter the following:

VERB 21	NOUN 10	ENTR
00077		ENTR
00000		ENTR
Press		RSET

Verify RESTART light is OFF.

Addition 13: Add Paragraph 6.3.10.2.9.1 as follows:

6.3.10.2.9.1 On K-148 enter the following sequence:

VERB 01	NOUN 10	ENTR
00077		ENTR

Verify DSKY Row 1 display has bit 6 on. Other combinations of bits are permissible but bit 6 must be on.

Addition 14: Revise Paragraph 6.3.10.2.10 to read as follows:

6.3.10.2.10 On PSAAM, set INHIBIT VOLTAGE FAIL switch ON.
On DSKY enter the following:

VERB 21	NOUN 10	ENTR
00077		ENTR
00000		ENTR
Press		RSET

Verify that RESTART light is OFF.

Addition 15: Add Paragraph 6.3.10.2.14.1 as follows:

6.3.10.2.14.1 On K-148 enter the following sequence:

VERB 01	NOUN 10	ENTR
00077		ENTR

Verify DSKY Row 1 display has bit 6 on. Other combinations of bits are permissible but bit 6 must be on.

Addition 16: Revise Paragraph 6.3.10.2.15 to read as follows:

6.3.10.2.15 On PSAAM, set INHIBIT VOLTAGE FAIL switch ON.
On DSKY enter the following:

VERB 21	NOUN 10	ENTR
00077		ENTR
00000		ENTR
Press		RSET

Verify that RESTART light is OFF.

Addition 17: Add Paragraph 6.3.10.2.17.1 as follows:

6.3.10.2.17.1 On K-148 enter the following sequence:

VERB 21	NOUN 10	ENTR
00077		ENTR

Verify DSKY Row 1 display has bit 6 on. Other combinations of bits are permissible but bit 6 must be on.

Addition 18: Revise Paragraph 6.3.10.2.18 to read as follows:

6.3.10.2.18 On PSAAM, set INHIBIT VOLTAGE FAIL switch ON.
On DSKY enter the following:

VERB 21	NOUN 10	ENTR
00077		ENTR
00000		ENTR
Press		RSET

Verify that RESTART light is OFF.

Addition 19: Add Paragraph 6.3.11.16.1 as follows:

6.3.11.16.1 On K-148 enter the following sequence if the RESTART lamp came on in above step.

VERB 21	NOUN 10	ENTR
00077		ENTR
00000		ENTR
Press		RSET

APOLLO G&N Specification
ND1002323 REV R
Original Issue Date:
Release Authority: TDRR
Class A Release

POST-INSTALLATION CHECKOUT SPECIFICATION

FOR LM G&N SYSTEM

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
11/25/68	L	37085	7, 24, 35, 68, 78, 82 Total No.	EA	WLS
			pages now 106		
3/27/69	M	37452	14, 20-22, 43-101, Was 103	EA	RJJ
			pages, now 109 pages.		
6/13/69	N	37620	20-66	EA	--
11/6/69	P	37912	56 - 109. Was 109 pages;	EA	MDH
			now 114.		
11/25/69	R	37984	26	EA	MDH

This specification consists of page 1 to 114 inclusive.

APPROVALS	W. S. Swingle NASA/MSC	MIT/IL	H. D. Peryk D. A. Zimmer AC	J. F. Pizzale 3/21/69

APOLLO G&N Specification
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11/27/68	L	37063	7, 34, 35, 60, 76, 81. Total No.	EA	WLS
			pages now 106.		
1/27/69	M	37452	14, 20-22, 43-105. Was 105	EA	[illegible]
			pages, now 108 pages.		
6/18/69	N	37620	20-68	EA	--
11/6/69	P	37912	54 - 109. Was 109 pages;	EA	MDH
			now 114.		
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This specification consists of page 1 to 114 inclusive.

APPROVALS	W.S. Swingle NASA/MSC	MIT/IL	R.D. Petryk D.A. Ziemer	J.F. Piazzola AC 3/23/68